P026-S

Citric acid production by Yarrowia lipolytica under increased air pressure

P. Ferreira[1], M. Mota[1], I. Belo[1]

[1] *CEB- Center of Biological Engineering,University of Minho, Campus de Gualtar 4710-053 Braga, Portugal, e-mail: patricia.ferreira@ceb.uminho.pt*

Oxygen mass transfer rate (OTR) from air to liquid phase has been a serious handicap to the productivity of several biological processes, particularly for bioprocesses based in aerobic cultures. OTR improvement can be achieved by the increase of total air pressure in bioreactors with microbial cultures, due to the increase of oxygen solubility in the medium [1].

Yarrowia lipolytica, strictly aerobic yeast, is known for the ability of producing several high value compounds such as enzymes, aroma and organic acids [2]. Citric acid is produced under limited nitrogen conditions but the production can be influenced by other conditions, like pH and oxygen availability. High levels of dissolved oxygen tension between 50 % and 80 % have been reported as required for efficient citric acid production [3].

In this work air pressure increase (up to 4 bar) was applied as a way of OTR enhancement in the production of citric acid by *Yarrowia lipolytica* W29 from crude glycerol, a byproduct from the biodiesel production. Preliminary results indicated that *Y. lipolytica* batch growth was not inhibited by pressure and the production of citric acid was slightly accelerated by the bioreactor pressurization.

References

1. Lopes M., Mota M., Belo I.: Oxygen Mass Transfer Rate in a Pressurized Lab-Scale Stirred Bioreactor. *Chemical Engineering & Technology* **36** (10) 1779–1784. (2013). 2. Coelho M.A.Z., Amaral P.F.F., Belo I.: Yarrowia Lipolytica: An Industrial Workhorse. Curent research, *Technology and Education topics in Applied Microbial Biotechnology* 930–944 (2010). 3. Rywińska A., Musiał I., Rymowicz W., Zarowska B.: Effect of Agitation and Aeration on the Citric Acid Production by Yarrowia Lipolytica Grown on Glycerol. *Preparative Biochemistry & Biotechnology* **42** (3) 279–91(2012).